

interest suggested by the arrival of the Expedition at the mouth of the Yennissei. Evidence is given to prove that the lower Yennissei must at one time have been thickly inhabited, but is now quite deserted, probably owing to the difficulty of procuring food, a difficulty that may be solved by the enterprises begun by Baron Nordenskjöld. A long list of phanerogams is given, collected during the stay of the expedition. Some interesting dredging results were obtained, and on this subject Baron Nordenskjöld writes :—

"For the science of our time, which so often places the origin of a northern form in the south, and *vice versa*, as the foundation of very wide theoretical conclusions, a knowledge of the types which can live by turns in nearly fresh water of a temperature of + 10°, and in water cooled to - 2°7, and of nearly the same salinity as that of the Mediterranean, must have a certain interest. The

most remarkable were, according to Dr. Stuxberg, the following : a species of *Mysis*, *Diastylis Rathkei*, Kr., *Idothea entomon*, Lin., *Idothea Sabinei*, Kr., two species of *Lysianassida*, *Pontoporeia setosa*, Stbrg., *Halimedon brevicalcar*, Goës, an Annelid, a Molgula, *Yoldia intermedia*, M. Sars, *Yoldia (?) arctica*, Gray, and a *Solecurtus*."

On the long Yalma Peninsula on the west of the Gulf of Obi, the author collects all the information known, but that is not much. The ground everywhere seems to consist of sand and sandy clay, and Baron Nordenskjöld, when he landed, could not find a stone so large as a bullet or a pea. Two chapters are devoted to a history of the navigation of the North-east Passage from 1556 to 1878 ; an admirable summary, containing much that is the result of the author's own research, and which never before has seen the light. Especially is this the case



FIG. 6.—The *Vega* and *Lena* saluting Cape Chelyuskin.

with the numerous Russian voyages of the seventeenth, eighteenth, and nineteenth centuries, of which little is known, but the results of which Baron Nordenskjöld acknowledges have been of the greatest service to him in forming his own plan. To the efforts of the Norwegian walrus hunters, too, Carlsen, Tobiesen, Johanessen, and others, he does full justice ; and indeed their contributions to science have often been of substantial value ; Johanessen, was awarded two medals by the Swedish Academy for his discoveries.

Port Dickson was left on August 10, and as the *Vega* steamed north-east to Chelyuskin over an imperfectly mapped coast, she came across many new islands, and other novelties which we cannot refer to in detail. Animal life along the Taimur coast was much scarcer than in previous parts of the voyage, though on the other hand the sea yielded some fine specimens. We give as an example a hairstar (Fig. 5) from off the coast.

The northern promontory of Asia was reached on August 19, and Baron Nordenskjöld describes the landscape as "the most monotonous and desolate I have ever seen in the High North" (Fig. 6). Here, however, we must leave the *Vega* till next week.

(To be continued.)

#### NOTES

TAKING a retrospective *coup d'œil*, in a recent issue of his paper, of the Paris Exhibition, Count du Moncel notes, among other points, the marked success of the lectures, and the eagerness of the public to be instructed. A permanent electrical exhibition, with like facilities, would greatly promote the development of electric industries. The number of practical electricians in France is at present very limited, and while there are some very skilful makers of telegraphic apparatus and instruments for

electrical physics, yet (if electroplating be excepted) there are no great industries giving rise to electric works like those of the cable-manufacturing houses in England, or those of Siemens and Felten in Germany. The Count hopes "our *Plan* henceforth will not be confined to mere publication of electric papers." Again, a desideratum at the Exhibition was the attachment of placards to apparatus, indicating its object and general arrangement. This is a matter worth attention in our forthcoming Exhibition. At first there was some talk about giving evening concerts at the Paris Exhibition, but the fact that the city had agreed with the concert at Besselièvre, behind the Palais de l'Industrie, not to allow any concert performances within a radius of 100 m., was a difficulty. It is doubtful (the Count says) if such concerts would have much increased the evening attendance, which was always large. With regard to the Crystal Palace Exhibition, he considers it should have been put off for a year.

ON the proposition of M. Cochery, Minister of Posts and Telegraphs, the Minister of Foreign Affairs and President of the Council has nominated Dr. Warren De La Rue, F.R.S., correspondent of the Institute (Academy of Sciences), a Commander of the Legion of Honour, in recognition of his services at the Electrical Congress and as vice-president of the jury. We regret to learn that Dr. Warren De La Rue, in consequence of ill health, has been compelled to resign the important post of Honorary Secretary to the Royal Institution.

THE Lightning-Rod Conference formed by delegates from the Meteorological Society, the Royal Institute of British Architects, the Society of Telegraph Engineers, and the Physical Society, which has been at work since November, 1878, has at last completed its labours and prepared its report, which, together with an enormous mass of information that has been most assiduously got together, will very soon be published. The report will consist of a brief description of the purposes which a lightning-conductor is intended to serve; a statement of those features in the construction and erection of lightning conductors respecting which there is a great difference of opinion; and the final decision on the points in question arrived at by the Conference. It will also contain a simple code of rules for the erection of lightning-conductors which any ordinary non-technical individual will be able to understand. It is hoped that the success of the publication will justify the labour that has been expended upon it. It will be published in the form of a book by Messrs. Spon and Co.

IN view of the recent great development of the telephonic system, the Directors of the Magdeburg Fire Insurance Company have lately sought information from the Secretary of the Imperial Post Office, Dr. Stephan, as to whether the danger from lightning was increased by the overhead wires and iron supporting rods, and whether special conditions of insurance should be made for houses in proximity to such wires. Dr. Stephan has replied that no case had yet come to his notice in which lightning had done injury in the way referred to. The experience of the German Post Office with telephone lines was indeed short; but in other countries there was an experience of overhead telegraph lines, which was of several years' extent, and he was not aware that observations had occurred in this connection which had given any occasion for anxiety about lightning. It was important, in arranging those telephone lines, to take care that any atmospheric discharges which might affect them should have a sufficient path to earth. Such being the case the telephone wires might even afford houses a protection against lightning which they would otherwise lack. The directors of the insurance company think it at present unnecessary, therefore, to make any change in their terms in the case of houses over which telephone lines pass.

WE regret to have to record the death of Mr. Charles Moore, the well-known geologist of Bath. Mr. Moore was known as a most indefatigable and successful collector. On one occasion he carted from a fissure near Bristol two tons of the celebrated bone-bed. This when sifted and examined afforded no less than 45,000 teeth, besides portions of many fish and reptiles. Most important of all, it yielded nineteen teeth of the Triassic mammifer *Microlestes*, which Mr. Moore had thus the good fortune to discover. On another occasion he astonished the British Association by his power of predicting from the forms of nodules the genera of fish which would be found inclosed in them when they were broken open. His interesting discovery of Liassic shells in lead veins traversing the carboniferous limestone was the subject of a most valuable communication to the Geological Society, and he was also one of the first to recognise the importance of the Rhætic formation in this country. The Museum at Bath owes much to the persevering labours of Mr. Charles Moore.

A REUTER'S telegram, dated New York, December 18, announces the death of Dr. Isaac J. Hayes, the Arctic explorer. Dr. Hayes, it will be remembered, was surgeon of Dr. Kane's second Arctic expedition, with which he returned to the United States in 1855. A conviction that there existed an open Polar sea induced him in 1860 to undertake a voyage of exploration on his own account. He sailed from Boston in the schooner *United States*, and by means of sledges he penetrated as far north as 81 deg. 37 min. He again visited Greenland in 1869. To the last he was desirous of heading another expedition to the North Pole by way of Smith's Sound. His voyage in the *United States* was described in "The Open Polar Sea;" and among other works from his pen were, "An Arctic Boat Journey," relating to his first voyages; "Cast away in the Cold," a supplementary narrative of his second voyage, published in 1870; and an account of Greenland under the title of "The Land of Desolation." The Geographical Society of London and the Société de Géographie of Paris awarded him gold medals for his discoveries.

THE death is announced, at the age of seventy two, of the Rev. Dr. John Ludwig Krapf. Dr. Krapf was a missionary of the Church Missionary Society in East Africa from 1837 to 1853, and did much for the exploration of the region north-west of Zanzibar, in company with Dr. Rebmann. They are known specially as the discoverers of Kilimanjaro and Mount Kenia.

IN a paper published in the July number of the *Archives des Sciences Physiques et Naturelles* of Geneva, which we referred to at the time, M. F. Forel established, by observations of the oscillations of the lowest extremity of the glacier of the Rhone since 1856, that, although two causes determine the position of the end of a glacier, nevertheless the chief of them is not the fusion of this end by the summer heat, but the rate of advance of the glacier. As the latter depended upon the thickness of the glacier, he concluded that the variations of the length of a glacier depend chiefly upon the variations of its thickness. Measurements having shown considerable variations of thickness at the lower end of the Rhone glacier, these might be easily explained by very small changes in the thickness of the *nevé*, which changes are, so to say, exaggerated by the mutual relation of the rate of advance and the thickness, producing thus immense changes in the length of the glacier. Glacialists will appreciate the great importance of these observations of M. Forel, as they may explain an immense increase of glaciers without great variations of temperature, but only by small changes in the distribution of snow and rain which fall upon a country. However, as is pointed out by those glacialists who have sought for the key of the glacial period in an accurate

study of what is going on now in Arctic countries, this relation has been rather neglected. In a second paper, which has just appeared in the November number of the *Archives*, M. Forel discusses the influence of ablation on the thickness of a glacier, the ablation, together with the amount of snow fallen on the surface of the *nevé*, being the two chief causes of changes in thickness. Our knowledge of the influence of ablation is almost nothing; but the influence due to an increase, or decrease, of the feeding of a glacier being felt, and exaggerated, throughout the whole length of a glacier, while the ablation has an importance only in its lower parts, M. Forel concludes that this second cause never would have the importance of the first. In any case both causes never can be simultaneous, the *nevé* taking fifty or a hundred years to reach the low end of the glacier; thus the thickness of a glacier at this end depends upon the quantity of snow fallen on the *nevé* some fifty or a hundred years ago, and on the ablation during a few recent years, which causes may be either concurrent, or opposing, in increasing or decreasing the thickness. He remarks also that altogether it seems that the retreat of glaciers, which reached its maximum about the year 1875, was not a local phenomenon, but was simultaneously observed in the Austrian Alps, in the Pyrenees, in the Caucasus, in Scandinavia, and in Greenland. M. Forel concludes by asking the naturalists of all countries to indicate the advance and retreat of glaciers as much as possible in figures, and to measure the thickness of glaciers at several well-determined parts.

WE fear all hope must be given up as to the safety of Mr. Powell in the *Saladin* balloon. A balloon was seen on the night of the 16th, going by Santander and Bilbao towards the sea, but nothing more has been heard of it. It may have been the *Saladin*, but if so, and Mr. Powell had been in it and conscious, he would certainly have made some sign. Mr. Powell was an ardent and intelligent aéronaut, and his death, which we fear is only too certain, must be regarded as a loss to science in the pursuit of scientific knowledge.

THE Royal Italian Scientific Institution at Venice offers a number of prizes for various memoirs. Among them we note the following two as of more general interest:—(1) "A Statement of the Hypotheses recently advanced by Physicists on the Causes of the Phenomena of Light, Heat, Electricity, and Magnetism" (prize 3000 lire (about 110*l.*), term March 31, 1883). (2) "A Systematical and Critical Enumeration of the Cryptogamic Plants hitherto observed in the Venetian Provinces" (prize and term for this treatise are not yet fixed).

THE death is announced, on November 29 last, of Dr. Wilhelm Weith, Professor of Chemistry at Zürich University. He died in the Island of Corsica, where he was staying on a visit, at the early age of thirty-seven years.

IN the night of November 19–20 the tunnel through the Col di Tenda, on the frontier between France and Piemont, was broken through. Cuneo is the nearest place on the Italian side of the mountain, where the Italian railways will join the new French branch extending through the tunnel.

WE have on our table the following books:—Cultivation of Liberian Coffee, by H. A. A. Nicholls (Silver and Co.); Report of the Scientific Results of H.M.S. *Challenger*, 1873–76, Vol. iii. Zoology; Kouniss, by G. L. Carrick (Blackwood); Every-day Life in Our Public Schools, edited by C. E. Pascoe (Griffith and Farran); Statistical Atlas, Parts x. and xi., by C. P. Bevan (W. and A. K. Johnston); Perfect Way in Diet, by Anna Kingford (Kegan Paul); Educational Theories, by Oscar Browning (Kegan Paul); The Bedfordian System of Astronomy, by J. Bedford (H. Vickers); Description of the Chemical Laboratory at the Owens College, Manchester, by Prof. H. E. Roscoe,

F.R.S. (Cornish); Ideality in the Physical Sciences, by B. Peirce (Little, Brown and Co.); European Ferns, by James Britten (Cassell, Petter, and Galpin); The Encyclopædic Dictionary, by Robert Hunter (Cassell, Petter and Galpin); John Amos Comenius, by S. S. Laurie (Kegan Paul); Elementary Treatise on Electricity, by Prof. Clerk Maxwell (Clarendon Press); Astral Origin of the Emblems and Hebrew Alphabet, Rev. J. H. Broome (Stanford); Encyclopædia Britannica, vol. xiii. (A. and C. Black); Old Greek Education, by J. P. Mahaffy (Kegan Paul); Practical Chemistry, by Howard (William Collins); British Almanack and Companion (Stationers Company).

THE following recently-published Norwegian and Danish books may interest some of our readers:—"A Geological Description of the Lofoten and Vesteraalen Districts of Norway," by K. Pettersen, with maps, and with interesting remarks on the coal-bearing Jura formation of those provinces; "A Flora of Iceland," by M. Chr. Grönlund, being the results of his visits to Iceland during the years 1868 and 1876, from which he has brought back very rich collections of plants; the flora of Iceland includes, according to M. Grönlund, 870 species, of which 332 are Phanerograms, the total number having to be increased by many Algae; "From Fields and Forests: Pictures of the Life of Insects," in two volumes, by M. v. Bergsöe; and a pamphlet, by M. R. Lehmann, on the former coast-lines in Norway.

S. A. LEXE, who steadily pursues his studies on the recent geology of Norway, contributes to the last number of the Norwegian *Archiv* for mathematics and natural science, a paper on the upheaval of Norway, and its coast-lines and terraces.

ADVICES received at Plymouth give some particulars of a destructive typhoon which visited Haiphong and Tallee on October 8, causing great destruction and loss of life. The wind blew with tremendous violence, and the heavy sea flooded the whole of the surrounding country. In Tallee there were six feet of water in the houses three and four miles distant from the seashore. The current was so strong that it swept away the entire town, the number of persons drowned being estimated at over 3000.

IN the December number of the serial *Auf der Höhe*, Prof. Palmieri, the Director of the Observatory on Mount Vesuvius, communicates a discovery with regard to volcanoes. In a series of spectro-analytical examinations of the lava Prof. Palmieri has, it is stated, just discovered a new line which corresponds exactly with that of helium, the famous element hitherto seen in the solar spectrum only.

THE displacement of *isotherms* (or lines drawn through places having an equal mean temperature), with the season, has some interesting practical bearings. Several years' recent (so-called) phenological observation in Sweden proves that in general each phenomenon of plant-life occurs only at a certain temperature. A similar rule applies to the arrival of many birds of passage. Comparing the times such phenomena take to advance one degree of latitude, it is found on the Baltic coast that their greatest velocity is in midsummer. The numbers of days for an advance of one degree are in sundry cases as follows:—Freeing of lakes from ice 6°, flowering of April plants in Southern Sweden 4°, of May plants 2°, of June plants 1°, of July plants 0°, appearance of leaves (general average) 2°, ripening of fruit 1°, fall of leaves 2°, freezing of lakes 5°. A recent study by Herr Hildebrand (of Upsala) of the movement of isotherms in the north of Europe throws light on these facts, showing (among other things) that while in Sweden the rate of the movement increases with the temperature, in Russia it remains nearly constant. The author gives a number of maps for various temperatures. Taking 0° it is found that the isotherms running nearly north and south move eastwards, but in

the interior of the continent they are bent at a right angle, extending east and west, and moving to the north. In the map for  $9^{\circ}$  the influence of greater heating of land than of sea is apparent. The isotherms are nearly straight lines east and west, and move from south to north. For  $12^{\circ}$  they extend west-south-west to east-north-east, and move towards north-north-east.

IN the wave of administrative economy which has passed over Japan during the past three years, education has, we regret to notice, suffered. The allowance to the Education Department for the current year is only 914,601 *yen* against 1,181,100 *yen* last year—a reduction of 266,499 *yen*, or nearly 25 per cent. The expenditure on working the mines has also been diminished nearly 50 per cent. It is right to observe, however, that the estimates of every department have been largely cut down, and that much of the decrease under the head of education may be attributed to the substitution of native teachers for highly-paid foreign professors.

MR. H. TRUEMAN WOOD, Secretary of the Society of Arts, asks us to draw the attention of our readers to the Exhibition of Photographic Apparatus which the Society proposes to open next month. They hope to be able to include in the Exhibition apparatus illustrating some at least of the many applications of photography to scientific purposes, and Mr. Wood will be very grateful to any person who will entrust the Society with any such apparatus to be shown during the short time the Exhibition will remain open. Mr. Wood will gladly send full particulars of the Exhibition to anybody sufficiently interested in the matter to apply for them.

PROF. R. S. BALL, Royal Astronomer of Ireland, will give the first of a Course of Six Lectures on the Sun, the Moon, and the Planets (adapted to a juvenile auditory), at the Royal Institution on Tuesday next, the 27th instant.

A VIOLENT shock of earthquake is reported from Agram on November 20, at 8.27 a.m. The duration of the shock was two seconds, its direction perpendicular, and its intensity so great that a panic was caused, and the schools remained closed for the day. Earthquakes are reported (1) from Stassfurt, where a violent shock occurred on December 2 at 4.18 a.m., causing considerable damage in the salt-mine of Leopoldshall; (2) from Siders (Valais), where a strong shock was noticed on December 4 at 2.55 a.m.; (3) from Agram, where a shock of two seconds duration occurred on December 9 at 9.55 a.m.

THE annual meeting of the Geographical Society of Paris has been held for the first time under the presidency of M. de Lesseps. The meeting was numerous and enthusiastic. M. de Lesseps gave an address in which he eulogised his predecessor, Admiral La Roncière le Nourcy, who died recently. On the following evening the usual banquet took place at the Hotel Continental.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*) from South Africa, presented by Capt. Wyld; two Squirrel Monkeys (*Chrysothrix sciurea*) from Demerara, presented by Mr. F. N. Aphorop; a Black-backed Jackal (*Canis mesomelas*) from South Africa, presented by Capt. C. Hollard Smith; two Ferrets (*Mustela furo*) from Japan, presented by Mrs. J. F. Faed; a Bosch-bok (*Tragelaphus sylvaticus*) from South Africa, presented by Mr. E. W. Berryman; a Rose-coloured Pastor (*Pastor roseus*) from India, presented by Mr. F. Lubbock; a Herring Gull (*Larus argentatus*), a Greater Black-backed Gull (*Larus marinus*), European, presented by Mr. E. W. Ebsworth; six Dwarf Chameleons (*Chamæleon pumilus*) from South Africa, presented by Col. Hassard, R.E.; a Green Monkey (*Cercopithecus callitrichus*), a Mona Monkey (*Cercopithecus mona*) from West

Africa, a Cerastes Viper (*Vipera cerastes*) from Algeria, deposited; four Snow Buntings (*Plectrophanes nivalis*), two Common Siskins (*Chrysomitris spinus*), British, purchased.

#### OUR ASTRONOMICAL COLUMN

A VARIABLE OF THE ALGOL TYPE.—A telegram to the Earl of Crawford's Observatory at Dunecht, notifies that Mr. Sawyer of Boston, U.S., has detected a variable of the comparatively rare type of Algol, with a period of 5·24 days, its brightness varying between 6·0 and 6·7, and 1881, November 30·84 being an epoch of minimum. It is number 854 of Sir J. Herschel's third series of observations with the 20-feet reflector, published in Vol. iii. of the *Memoirs* of the Royal Astronomical Society; it is there called 5m. with a minute companion 88° n.p. 25", and a note says, "not in Piazzi"; these observations were made in 1827-28. The star is Lalande 31384, observed 1797, May 24, and estimated 6½; Bessel calls it 7m. in July 1822, and Santini has the same magnitude at the end of July or beginning of August 1838. Lamont has two observations at which it was estimated 7m. and 8m. In the *Durchmusterung* it is 5·5, and on the Atlases of Argelander and Heis 6m. Schjellerup called it 7·7 on 1863, June 9, and in his catalogue of 1864 he pointed out the differences in the estimated magnitudes of previous observers. Dr. Gould, in the *Uranometria Argentina* mentions that a series of comparisons between August and October 1871, indicated "an oscillation of magnitude from 6·0 to 6·5, but exhibiting no regular law in the variation"; in the catalogue he has "6·7 var.?" Taking into consideration the estimates of various observers it might be inferred the true limits of magnitude may be somewhat wider than assigned above. The position of the star for 1882° is in R.A. 17h. 10m. 33s. Decl. + 1° 20' 6".

A PROBABLE VARIABLE-STAR.—The following is a case which appears to be worthy of attention:—D'Agelet observed a star in 1783, on July 26, 27, and 29, which he estimated on the three nights 6, 6, and 6·5 respectively. It is No. 5057-59 in Dr. Gould's reduced Catalogue, and there called *Anonyma*: in fact it is not found, so far as we know, in any modern catalogue except the *Durchmusterung*, where it is +17°, 3997, and estimated only 9·4. The place of the star from D'Agelet, brought up to 1880°, is in R.A. 19h. 27m. 22·10s., Decl. +17° 29' 28"·0.

THE BINARY STAR  $\eta$  CASSIOPEIÆ.—The elements of this beautiful revolving double-star, which had been already calculated by Duner, Doberck, and Gruber, in 1875 and 1876, have been newly investigated by Ludwig Struve, son of the present director of the Imperial Observatory at Pulkowa. The principal characteristic of the new orbit consists in its depending entirely upon the measures of Bessel and the two Strubes between 1830 and 1878, the early data of Sir W. Herschel, which, if taken into account, would exercise an influence much greater than is due to their degree of accuracy, being left out of consideration. The resulting elements are as follow:—  
 Periastron passage ... 1805·02 | Inclination ... 56° 22'  
 Node ... 45° 3' | Eccentricity ... 0·6296  
 Node to periastron ... 238° 17' | Semi-axis major 8° 786  
 For Eq. ... 1850·0 | Period of revolution 148·90 yrs.  
 Duner had found the period 176, Gruber 195, and Doberck 222 years. A comparison with the measures of Dembowski (1856-76) and Duner (1868-75) exhibit constant differences, upon which M. O. Struve remarks at some length in a note to his son's memoir (*Bulletin de l'Acad. des Sciences de St. Petersbourg*, tome v.).

According to the above orbit the components close in until the year 1907, when their apparent distance is at a minimum of 1°·9 on an angle of about 305°. To test the longer and shorter periods we have:

|            | In Doberck's Orbit. | In L. Struve's Orbit. |
|------------|---------------------|-----------------------|
| 1882·0 ... | 162° 1 ... 5" 54    | 165° 8 ... 5" 44      |
| 1883·0 ... | 164° 6 ... 5" 51    | 168° 1 ... 5" 40      |

M. Otto Struve's observations gave for the parallax of this star  $0^{\circ}1543 \pm 0^{\circ}0450$ , whence the mass of the two components results 8·33 times that of the sun, and the author of the memoir further concludes that the larger star has a mass 6·57 times, and the smaller one 1·76 times the solar mass. Prof. Auwers finds the proper motion of  $\eta$  Cassiopeiae + 0·1346s. in right ascension, and -0°·481 in declination, or 1°·196 in great circle, in the direction 113°·7.